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SCIENTIFIC NOTES.

Anglesite, Cerussite and Sulphur from the Mountain View Lead Mine, near Union Bridge, Carroll Co., Md.

By GEORGE H. WILLIAMS.

The occurrence of considerable masses of mineral ores in connection with the crystalline limestone bands of Carroll and Frederick Counties, Maryland, has long been known. The most abundant of these are various sulphides of copper, which have been intermittently worked at Liberty, New London, and at the Dolyhyde Mine for over forty years, though never with any profit to the owners. Quite recently there has been opened by a company of Baltimore gentlemen a similar deposit of lead ore (galena) on the property of Miss Elizabeth Cox, about two miles south-west of Union Bridge on the Western Maryland Railroad.

At this locality a narrow ridge of sandstone separates the courses of Beaver Dam and Sam's Creeks, both of which flow nearly north through limestone valleys. The strike of the rocks is approximately north and south; their dip steeply to the east. The limestone of the more western stream, Beaver Dam Creek, therefore dips under the micaceous schist, which in turn passes below the sandstone. It is at the top of this limestone, which is here a hard, compact and variegated marble, along its contact with the overlying schist, that the lead ore occurs. Its existence has been known for many years from its outcrop on the Cox farm, but it has never been opened until recently.

At present three small shafts have been sunk into the ore. At the deepest of these, on the Cox farm, the galena is considerably rotted, in consequence of which certain new products have been formed. These are principally anglesite, cerussite and native sulphur, which have crystallized in the cavities of the ore in such perfection as to well merit a description. The limestone at this place also contains, besides the galena, a small quantity of copper. This occurs mostly as imperfect, disseminated crystals of chalcopyrite, which have become iridescent through superficial change to bornite. Some of it has also changed to malachite, which often forms radiating groups of bright green needles.

The specimens from this locality thus far available for study comprise a few collected by me during a brief visit to the mine last June, and some others obtained later in the summer by Mr. H. C. Jones. I shall give in detail the results of observations made upon the anglesite, cerussite and sulphur found in this rather scanty material; for, beside their intrinsic scientific interest, they give promise of much more abundant and perhaps better crystals, in case explorations are continued by the mining company at this point.

I am happy to acknowledge important assistance received during this investigation through the careful crystallographic work of Mr. M. J. Vea.

ANGLESITE.

Anglesite is perhaps the most abundant of the crystallized alteration products of the galena. It occurs, however, only in the more rotted and porous portions of the ore, and is accompanied by many earthy decomposition products. The crystals are mostly small, rarely attaining a length of three or four millimeters. They range from this size down to those of microscopic dimensions. The smaller ones are the most perfect and highly modified, and illustrate quite a variety of types. In spite of their much smaller size, these little crystals compare favorably, both in lustre and perfection, with the famous anglesites from Mte. Poni in Sardinia.

Ten of these crystals were carefully selected for measurement, and, although some of them were less than a millimeter in diameter, the reflections which they yielded were quite satisfactory. Upon these crystals the following twelve forms were observed: $\infty \bar{P} \bar{\infty}$ (010) a; $0P$ (001) c; ∞P (110) m; $\infty \bar{P} \overline{7/4}$ (740) P; $\breve{P} \breve{\infty}$ (011) o; $\frac{1}{2} \bar{P} \bar{\infty}$ (102) d; $\frac{1}{4} \bar{P} \bar{\infty}$ (104) l; P (111) z; $\frac{1}{2} P$ (112) r; $\breve{P} \breve{2}$ (122) y; $\frac{3}{4} \bar{P} \bar{\frac{3}{2}}$ (324) p; and $\frac{3}{2} \breve{P} \breve{3}$ (132) s.[1] None of these forms are new to Anglesite. Indeed they are all mentioned in von Lang's monograph except P, which was first observed by Sella on Mte. Poni crystals in 1879.[2] Their occurrence was substantiated by several independent measurements in every case except the last, s. This form was observed only once, and then its single face was so rounded as to yield no thoroughly reliable result.

The combinations observed upon seven of the most representative crystals measured are given in the following figures. They may be arranged in three types, according as they are: 1) prismatic parallel to the brachydiagonal axis, with prevailing o and pyramidal terminations; 2) cuboidal, with short, stout brachydome o, terminated by the macropinacoid, a; or, 3) prismatic parallel to the macrodiagonal axis, with prevailing obtuse macrodome $\frac{1}{4} \bar{P} \bar{\infty}$ (104) l.

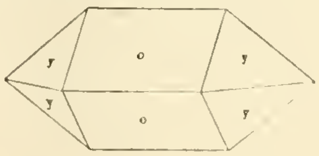

FIG. 1.

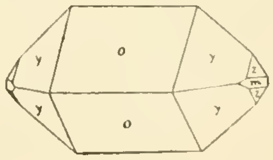

FIG. 2.

Type I.—Fig. 1. A simple combination, showing only o, terminated by y. Such crystals are quite common. They are usually very small, but very glistening and perfect. They are always attached by one end of the prism. This figure, like the succeeding three, is drawn in von Lang's position, *i. e.*, with the brachydiagonal axis running from right to left.

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[1] The letters are those given in Goldschmidt's Index.

[2] Acc. d. Lincei, Trasunti, vol. 3, p. 150. Aprile 1879. Zeitschr. Kryst. vol. 4, p. 400. 1880.

Fig. 2. Like the last, with the addition of the two forms, *m* and *z*.

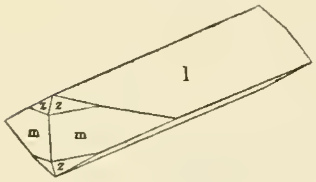

FIG. 3.

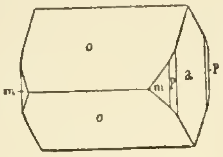

FIG. 4.

Type III.—Fig. 3. The crystals of this type show the greatest uniformity in their habit and combinations. They are the most abundant, and also much the largest of any observed from the Mountain View locality. Their length is not infrequently six mm. or over. The position of their optic axes as well as their cleavage shows that their elongation is parallel to the macrodiagonal axis. Like those of the preceding type, they are generally attached by one prismatic end. Doubly terminated crystals of this habit are, however, sometimes found. The faces *m* and *z* are usually perfect and glistening, while those of *l* are uneven and irregularly striated. This is the type described by von Lang from Leadhills.[1]

Type II.—Fig. 4. This is a short, stout crystal, like those of type I in having *o* as its prevailing form, but much shorter on account of a pinacoidal termination. Its only other forms are the two prisms, *m* and *P*. The latter would appear to be rare as it has only been observed by Sella on crystals from Mte. Poni. Crystals of this cuboidal habit appear not to have any special point of attachment. They present a considerable variety of combinations according to the various pyramidal forms which occur as replacements of the edges between the brachydome and the macropinacoid. Three of these are represented in the three orthographic projections upon the latter face (Figs. 5, 6 and 7). The first of these has the forms *a, m, z, y, o, d*; the second *a, m, z, y, o, d, r*; and the third *a, m, z, y, o, d, r, p, c*. In the last *p* is determined by the two zones, *a* : *r* and *z* : *d*.

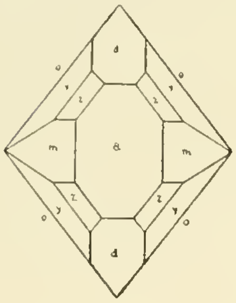

FIG. 5.

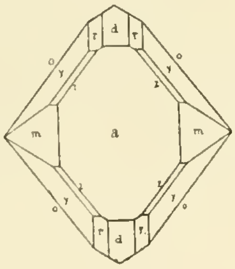

FIG. 6.

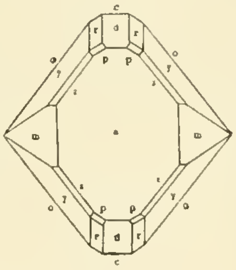

FIG. 7.

The following table gives the best angles observed on the crystals selected for measurement, and a comparison of them with the corresponding values calculated from von Lang's axial-ratio.

	OBSERVED.			CALCULATED.
o : *o*	104° 26′	104° 12′		104° 23.4′
o : *y*	153° 23½′	153° 10′		153° 17.3′
o : *z*	134° 52½′			134° 49.′
o : *s*	156° 27′			156° 57.′
a : *y*	116° 37′			116° 43.′
a : *r*	124° 44′	124° 00′	124° 29′	124° 37.′
a : *d*	129° 30′			129° 23.4′
a : *p*	Zone determi	nation.		135° 59.4′
l : *l*	135° 41′	134° 25′	134° 58′	135° 21.6′
a : *m*	141° 33½′			141° 51.7′
a : *P*	155° 34½′			155° 51.′
m : *P*	165° 59′	165° 48′		
m : *m*	103° 40′	103° 48′	103° 52½′	103° 43.4′
m : *z*	154° 23½	154° 36′		154° 24.5′

CERUSSITE.

The cerussite crystals, which occur quite abundantly in the rotted galena of the Mountain View Mine in connection with the anglesite, present quite a variety of form and habit. One of the most frequent combinations is the twin represented in Fig. 8, which is quite identical with one figured by von Kokscharow. The crystals are usually small, but have perfect, glistening faces, and one crystal individual is often much more developed than the other.

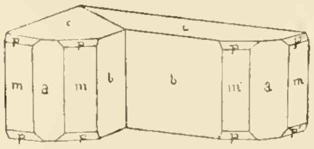

FIG. 8.

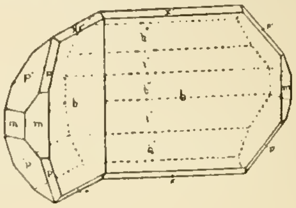

FIG. 9.

Fig. 9 shows another more interesting type of a twin. The two individuals are symmetrical to the face of the prism $(1\bar{1}0)$ and their brachy-diagonal axes intersect at an angle of 117° 14′. They show both brachy- and macro-pinacoids, together with the unit prism, and pyramid and another prism, $\infty P\breve{3}$ (130) *r*, not represented in the figure. Both individuals are bounded on the inside by the brachy-pinacoid, with only a trace of one brachy-dome, $\frac{1}{2}P\breve{\infty}$ (012) *x*; while on the outside the brachy-pinacoid is much reduced and a series of three well-developed brachy-domes, $\frac{1}{2}P\breve{\infty}$ (012) *x*; $P\breve{\infty}$ (011) *k*; and $2P\breve{\infty}$ (021) *i*, replace it. These crystals are always contact-twins, with never a trace of a third individual, and by this peculiar development of their planes they are given an unusually rounded and symmetrical form.

The angles observed by Mr. Vea on this crystal are here compared with the calculated values from von Kokscharow.[2]

	OBSERVED.	CALCULATED.
b : *i*	145° 16′	145° 20′ 2″
b : *k*	127° 3′ (Shimmer)	125° 52′ 1″
b : *x*	109° 53′	109° 52′ 30″
b : *x* (over c)	70°	70° 2′
b : *r*	151° 21½′	151° 21′
b : *m*	121° 23′	121° 22′ 55″

SULPHUR.

Indications of native sulphur are abundant through the rotted galena in which the anglesite and cerussite occur, but in the material thus far obtained only one crystal was discovered suitable for measurement. This was very small, not over 2 mm. in diameter, but on account of the number of its forms (thirteen), it abundantly repaid a careful examination. It was somewhat tabular in shape, parallel to one of the faces of its unit pyramid. It is chiefly noticeable for the great variety of planes in the zone of the unit pyramid. Of these there are no less than eight inclusive of the basal pinacoid and fundamental prism. These are OP (001) *c*; $\frac{1}{5}P$ (115) *t*; $\frac{1}{3}P$ (113) *s*; $\frac{1}{2}P$ (112) *y*; $\frac{3}{5}P$ (335) ϕ; P (111) *p*; 2P (221) δ; and ∞P (110) *m*. Of these one, ϕ, is new for sulphur, while δ was first observed in

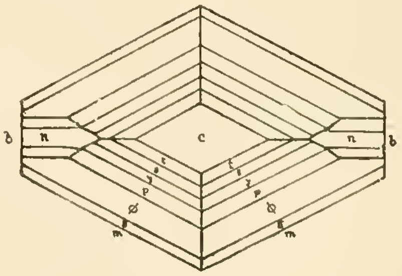

FIG. 10.

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[1] Sitzungsber. Wien. Ak. vol. 36, 1859. Pl. XIII, Fig. 90.

[2] Materialien z. Mineralogie Russlands, vol. 6, p. 135. 1870.

1888 by Molengraaff on volcanic sulphur crystals from the island of Saba in the West Indies.[1]

Other forms whose presence on this crystal could be established by measurement are: $\infty P\breve{\infty}$ (010) *b*; $P\breve{\infty}$ (011) *n*; and $P\breve{3}$ (133) *x*. Fig. 10 gives an orthographic projection of all these forms except the last upon the basal pinacoid.

On one corner two other forms could be distinctly observed as good-sized faces, but so obscured by the surrounding galena that they could not be measured. These forms appeared from their position to be $\frac{1}{3}P\breve{\infty}$ (013) *v*, and $\frac{3}{5}P\breve{3}$ (135) *z*, but the attempt to remove the galena, so that they would give reflections on the goniometer, unfortunately resulted in the injury of this portion of the brittle little crystal. Thus no measurements of these faces could be secured.

The following table contains the angles observed, principally by Mr. Vea, upon this crystal. They are compared with the angles calculated from von Kokscharow's axial-ratio.

	Observed.			Calculated.
$p : m$	162° 7′ (Shimmer)			161° 39′ 45″
$p : \delta$	172° 30½′ (Shimmer)	171° 10′		171° 4′ 15″
$p : \phi$	169° 20′	169° 32′	169° 47′	169° 25′ 25″
$p : y$	164° 33′		164° 40′	164° 47′ 51″
$p : s$	153° 28′	153° 26′	153° 28′	153° 30′ 1″
$p : t$			139° 22½′	139° 26′ 43″
$p : c$		108° 21½′	108° 20½′	108° 20′ 15″
$p : p$		106° 27′		106° 25′ 38″
$p : p$		85° 6′	85° 10′	85° 8′
$p : x$	152° 00′		151° 33′	152° 30′ 48′
$p : n$	131° 51′		132° 55½′	132° 34′
$p : b$			126° 48′	126° 47′ 11″

A Revision of the Cretaceous Echinoidea of North America. By William B. Clark.

[Published by permission of the Director of the United States Geological Survey.]

As a part of a report on the Mesozoic and Cenozoic Echinodermata of North America in process of preparation, the writer presents a preliminary notice of the Cretaceous Echinoidea. This is done with the hope that the number of new forms may be increased from other sources, than those already drawn upon and that further suggestions, as to new localities and the geological range of the different species described, may be obtained.

Through the kindness of Dr. C. A. White, the writer has had at his disposal all of the material bearing upon this subject in the possession of the U. S. National Museum, while similar favors have been granted by the Academy of Natural Sciences of Philadelphia, the American Museum of New York, the Texas Geological Survey, the Washington University of St. Louis and several private individuals.

Nearly every type specimen of the species hitherto described has been examined, together with a great quantity of material from the museums mentioned, so that the larger portion of American Cretaceous Echinoidea has in fact passed through the writer's hands.

A very brief description of the new forms is presented at this time. The figures will be given with the final report, which will embrace full descriptions and illustrations of all American species.

Cidaris armiger (Morton), 1842.

Described by Morton in 1841 as *Cidarites splendens.* The specific name *armiger* was substituted the following year. In Gabb's catalogue, published in 1859, *C. splendens* is referred to as *C. splendeus.*

Geological Horizon: Yellow Limestone of Middle Marl Bed.
Locality: New Jersey.

Cidaris Walcotti n. sp.

Characterized by imperforate mamelons and wide intertubercular spaces, which separate it from the preceding species.

Geological Horizon: Yellow Limestone of Middle Marl Bed.
Locality: New Jersey.

Cidaris texanus n. sp.

Test large, with narrow, sinuous ambulacral and wide interambulacral areas. Intertubercular space wide, and covered with numerous small granules. Tubercles prominent; areola circular, depressed and surrounded by row of large granules; boss smooth; mamelon small, imperforate. *C. Branneri* described by White, from Brazil, is allied to the present form, though presenting differences in the character of the areola and arrangement of granules in both the ambulacral and interambulacral areas.

Geological Horizon: Washita Formation of Comanche Series.
Locality: Texas.

Leiocidaris hemigranosus (Shumard), 1859.

A very large inflated form with prominent tubercles and perforated mamelons. Originally described by Shumard as a *Cidaris,* but from the occurrence of furrows uniting the pores of each pair must be referred to *Leiocidaris.*

Geological Horizon: Washita Formation.
Locality: Texas.

Salenia texana Credner, 1875.

Test moderately large, inflated. Ambulacra sinuous.

Geological Horizon: Washita Formation of Comanche Series.
Locality: Texas.

Salenia tumidula n. sp.

This species is characterized by its small size, straight ambulacra, wide intertubercular spaces with oval granules and apical disk covered with rows of granules radially arranged on each plate.

Geological Horizon: Yellow Limestone of Middle Marl Bed.
Locality: New Jersey.

Salenia bellula n. sp.

Small, depressed form with straight ambulacra. Intertubercular space covered with round granules. Apical disk more finely decorated, with less clearly defined radial arrangement of the granules than *S. tumidula.*

Geological Horizon: Yellow Limestone of Middle Marl Bed.
Locality: New Jersey.

Pseudodiadema diatretum (Morton), 1833.

Originally described by Morton as a *Cidaris.* Referred by Desor in 1858 to the present genus. Specimens of this form obtained by Credner in 1870, were referred to *Cidaris clavigera* and *C. sceptrifera.*

Geological Horizon: Yellow Limestone of Middle Marl Bed.
Locality: New Jersey.

Pseudodiadema texanum (Roemer), 1849.

Roemer referred this species in 1849 to *Diadema,* but later in "Die Kreidebildungen von Texas" (1852), considered it *Cyphosoma.* Although individual specimens fail to show with distinctness the perforated mamelons, this characteristic is sufficiently clear on others to prove that this species belongs to *Pseudodiadema.*

It is closely allied to or identical with the form described by d'Orbigny in 1842 from the U. S. Columbia under the name *Echinus Bolivarii* and later recognized by Gabb in a collection obtained from Peru. As the original description and figures leave some doubt on the subject, the specific name *texanum* is retained.

Geological Horizon: Fredericksburg Formation of Comanche Series.
Locality: Texas.

Pseudodiadema Roemeri n. sp.

This form described by Roemer in 1852 as *Diadema texanum,* when the preceding species was referred to *Cyphosoma,* must now be given a new name. *P. Roemeri* is suggested.

It is not improbable that *Cidarites pustulosus* Galeotti, established in 1840 upon specimens obtained from the Cretaceous (called Jurassic?) of Mexico, may be identical. The figures and descriptions are too poor to employ for final determination.

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[1] Zeitschrift für Kryst., etc., vol. 14, p. 46. 1888. After the above was in type I noticed for the first time that K. Busz of Bonn had observed the form $\frac{3}{5}P$ (335) *f*, and also $\frac{3}{7}P$ (337) *g*, on a sulphur crystal from Bassick, U. S. (Zeitschrift für Kryst., etc., vol. 17, p. 550, 1890.)

Geological Horizon: Fredericksburg Formation of Comanche Series.
Locality: Texas.

PSEUDODIADEMA HILLI n. sp.

Test slightly depressed above, with prominent ambulacra that show an increase in number of pores toward the apical disk. Interambulacral area covered with two rows of primary tubercles.

This form is separated from *P. texanum* in possessing only two rows of primary tubercles in the interambulacral areas and from *P. Roemeri* by the increase in pores toward the apical disk. Its depressed pentagonal form is likewise characteristic.

Geological Horizon: Austin Limestone.
Locality: Texas.

CYPHOSOMA SPECIOSUM n. sp.

Test small, with prominent ambulacra, that bear pores in single pairs in the sinuous poriferous avenues. Tubercles prominent; areola circular, generally confluent at upper and lower margins; boss crenulated; mamelon imperforate.

Geological Horizon: Yellow Limestone of Middle Marl Bed.
Locality: New Jersey.

GONIOPYGUS ZITTELI n. sp.

Test inflated, circular, flat or slightly concave below. Ambulacra wide with two rows of alternating tubercles that are smaller and more numerous than in the interambulacra. Tubercles prominent; areola indistinct; boss smooth; mamelon imperforate. Intertubercular space sparsely covered with granules. Apical disk large, star shaped.

This species shows close similarity to *Echinus patagonensis* described by d'Orbigny in 1842 from the Tertiary of Southern Patagonia. The ambitus of d'Orbigny's species is sharper and the apical disk of different shape. Moreover, if properly referred to the Tertiary it is undoubtedly a different form. *Echinus andinus* from the desert of Atacama, described by Philippi in 1860 is likewise closely allied to *G. Zitteli* though differing in form and the surface decoration of the plates.

Geological Horizon: Fredericksburg Formation of Comanche Series.
Locality: Texas.

PSAMMECHINUS CINGULATUS n. sp.

Test small, circular, elevated. Ambulacra with two rows of primary tubercles and both within and without these other rows of secondary tubercles. The more numerous interambulacral tubercles of like size with the ambulacral. Tubercles uncrenulated and imperforate. Poriferous avenue trigeminal.

Geological Horizon: Yellow Limestone of Middle Marl Bed.
Locality: New Jersey.

HOLECTYPUS PLANATUS Roemer, 1849.

Although marked variations are shown they are probably individual rather than specific.

Geological Horizon: Fredericksburg Formation of Comanche Series.
Locality: Texas.

PYRINA PARRYI Hall, 1857.

Geological Horizon: Washita Formation of Comanche Series.
Locality: Texas.

BOTRIOPYGUS ALABAMIENSIS n. sp.

Test large, oval, somewhat inflated, slightly broader in posterior portion. Peristome pentagonal with indistinct floscellae. Tubercles small, with perforated mamelons. The anal aperture is not visible, and the apical disk is absent on the specimen examined. This species is not unlike in many particulars *B. elevatus,* described by Gabb, from the Cretaceous of Peru. It is a larger form and more elongated than Gabb's type.

Geological Horizon: Ripley Formation.
Locality: Alabama.

ECHINOBRISSUS EXPANSUS n. sp.

Test broad, depressed, subquadrate, concave below. Mouth opening excentric and indistinctly pentagonal. Anal opening in broad deep sulcus that extends from apical disk to ambitus. Tubercles small with perforated summits.

Geological Horizon: Ripley Formation.
Locality: Alabama.

ECHINOBRISSUS TEXANUS n. sp.

Test small, oval, concave below. Anal sulcus much less pronounced than in *E. expansus.* Outer row of pores in each ambulacral area very slightly elongated.

Geological Horizon:
Locality: Texas.

TREMATOPYGUS CRUCIFER (Morton), 1830.

First described by Morton as *Ananchytes cruciferus.* It has been variously referred by subsequent writers but properly belongs to the genus *Trematopygus* of d'Orbigny, which Zittel considers a synonym of *Echinobrissus* and Duncan a subgenus of the same.

Geological Horizon: Yellow Limestone of Middle Marl Bed.
Locality: New Jersey.

CATOPYGUS OVIFORMIS Conrad, 1847.

Small elongated form.

Geological Horizon: Yellow Limestone of Middle Marl Bed.
Locality: New Jersey.

CATOPYGUS PUSILLUS n. sp.

Test broader and more depressed than in *C. oviformis* and anal aperture lower.

Geological Horizon:
Locality: Monmouth County, New Jersey.

CASSIDULUS FLOREALIS (Morton), 1833.

This species was first described by Morton as a *Clypeaster* but is a typical *Cassidulus.* It is a small elevated form with high anal aperture.

Geological Horizon:
Locality: New Jersey.

CASSIDULUS AEQUOREUS Morton, 1834.

Allied to *C. florealis* but more depressed and more elongated.

Geological Horizon: Ripley Formation.
Locality: Alabama.

CASSIDULUS MICROCOCCUS Gabb, 1860.

Separated from the two preceding species by its more oval, depressed form, small mouth opening and anal aperture situated in deep narrow sulcus.

Geological Horizon: Ripley Formation.
Locality: Alabama.

CASSIDULUS SUBQUADRATUS Conrad, 1860.

Large species with oval upper surface and nearly level base.

Geological Horizon: Ripley Formation.
Locality: Mississippi.

CASSIDULUS SUBCONICUS n. sp.

Allied to the preceding but with high subconical test. Apical disk situated anteriorly.

Geological Horizon: Ripley Formation.
Locatity: Mississippi.

CASSIDULUS PORRECTUS n. sp.

Very large depressed form with anal aperture in a shallow, short sulcus. The test is four inches broad by two high in the largest specimens.

Geological Horizon: Ripley Formation.
Locality: Mississippi.

CASSIDULUS STANTONI n. sp.

Small elongated form, depressed above, concave below, with wide anal aperture.

Geological Horizon: Colorado Formation.
Locality: Colorado.

Pygurus (?) geometricus (Morton), 1833.

Under the name *Clypeaster geometricus* Morton describes a cast from the Delaware and Chesapeake Canal that by Agassiz, d'Orbigny and Desor is referred to *Pygurus*. So few of the generic characters are preserved on the single specimen, Morton's type form, that the species is hardly worthy of recognition.

Geological Horizon: Lower Marl Bed.
Locality: Delaware.

Holaster cinctus (Morton), 1830.

First referred to *Ananchytes*. Synonomous with *A. fimbriatus* described by Morton at the same time.

Geological Horizon: Yellow Limestone of Middle Marl Bed.
Locality: New Jersey.

Holaster simplex Shumard, 1852.

Undoubtedly the same as *H. Comanchesi* Marcou described in 1858.

Geological Horizon: Washita Formation of Comanche Series.
Locality: Texas.

Enallaster texanus (Roemer), 1849.

Referred originally to *Toxaster*. Marked variations in size and depth of unpaired ambulacrum are found.

It seems probable that *Spatangus columbianum* from the U. S. Columbia described by Lea in 1840 may be identical, though the poor figure shows a different arrangement of the pores in the anterior paired ambulacra.

Enallaster peruvianus from Peru described by Gabb, in 1876, should probably be referred to this species.

Enallaster Karsteni described by P. de Loriol the same year from Equador is very closely allied to the larger and more depressed specimens of *E. texanus*, though the posterior paired ambulacra are somewhat longer and more widely separated.

Geological Horizon: Fredericksburg Formation of Comanche Series.
Locality: Texas.

Epiaster elegans (Shumard), 1852.

To this species should be referred *Macraster texanus* Roemer described in 1888. The genus *Macraster* established by Roemer for this form does not show a sufficiently wide difference from *Epiaster* to warrant its acceptance.

Geological Horizon: Washita Formation of Comanche Series.
Locality: Texas.

Epiaster Whitei n. sp.

Small, elevated form with depressed ambulacra. Apical disk anteriorly situated.

Separated from *E. elegans* by its smaller size, well marked ambulacral furrows, which do not reach to the ambitus, and position of apical disk and anal aperture.

Epiaster Whitei has been frequently confounded with *Enallaster texanus*.

Geological Horizon: Fredericksburg Formation of Comanche Series.
Locality: Texas.

Hemiaster parastatus (Morton), 1833.

Under the name of *Spatangus stella* the young of this form was described by Morton in 1830, but as the specific term *parastatus* has been so generally employed by later writers it is retained here.

Geological Horizon: Yellow Limestone Middle Marl Bed, Ripley Formation.
Locality: New Jersey, Alabama.

Hemiaster ungula (Morton), 1833.

Separated from the preceding species by its more elevated upper surface, sharper keel on posterior portion, and narrower and less depressed unpaired ambulacrum.

Geological Horizon: Yellow Limestone, Middle Marl Bed.
Locality: New Jersey.

Hemiaster texanus, Roemer, 1849.

It is probable that *Periaster australis* Gabb from Peru should be referred to this species.

Geological Horizon: Upper Division.
Locality: Texas.

Hemiaster Humphreysanus, Meek and Hayden, 1857.

This form is doubtfully referred by Meek and Hayden to *Hemiaster* as the fascioles are not preserved on the type specimens.

Geological Horizon: Fort Pierre Formation of Meek and Hayden.
Locality: Montana.

Hemiaster incrassatus n. sp.

This highly inflated form is wholly unlike any previously described American *Hemiaster*. The ambulacra are slightly depressed and the fasciole forms an oval ring slightly wider anteriorly. The furrow of the unpaired ambulacrum does not reach the ambitus.

Geological Horizon: Yellow Limestone of Middle Marl Bed.
Locality: New Jersey.

Hemiaster Dalli n. sp.

Test pentagonal in outline. Ambulacra depressed, the unpaired ambulacrum making a deep cut in the anterior ambitus. The anterior paired ambulacra are sinuous, the posterior short and broad.

Geological Horizon: Washita Formation of Comanche Series.
Locality: Texas.

Hemiaster californicus n. sp.

Test small, depressed. The ambulacra with well marked furrows, those of the anterior deep and broad. The unpaired ambulacrum affords a wide depression on the anterior ambitus.

Geological Horizon: Shasta (?) Formation.
Locality: California.

Linthia tumidula n. sp.

Test pentagonal, elevated above, inflated laterally. Ambulacra narrow, slightly depressed. Fascioles clearly defined. Anal aperture slightly supramarginal. Apical disk excentric, situated anteriorly.

Geological Horizon: Yellow Limestone of Middle Marl Bed.
Locality: New Jersey.

Among forms hitherto described from the Cretaceous which belong to the Eocene are

Scutella crustuloides, Morton, 1833.
Scutella Lyelli, Conrad, 1834.
Scutella Rogersi, Morton, 1834.
Coelopleurus infulatus (Morton), 1833.
Pygorhynchus Gouldii, Bouvé, 1846.

There seems to be some doubt also whether *Discoidea occidentale* Gabb first referred to the Cretaceous of Oregon may not have come from Peru. Meek in his "Check List of Invertebrate Fossils of North America, Cretaceous and Jurassic," published in 1864, mentions *Holectypus simplex* Shumard, probably by mistake, however, as no such form was described by Shumard, so far as the writer is able to discover. *Holaster simplex* Shumard, is later mentioned by Gabb, so that that form cannot be here referred to.

Cassidulus abruptus Conrad, described from the Cretaceous of Tippah County, Mississippi, is unfigured, and the writer has been unable to recognize it.

To *Cidarites propinquus* Münster, and *C. glandiferus* Goldfuss (by Quenstedt changed to *Cidaris glandarius*), Nyst and Galeotti, in 1840, refer two forms of *Cidaris* from the Cretaceous (called Jurassic?) of Mexico, that it is not possible to identify at the present time. The former was later named *Cidaris Galeotti* by Desor, who did not consider the Mexican form the same as *C. propinquus* of Europe. So far as it is possible to judge from the figures and descriptions these forms have not been reported from the Cretaceous strata of the United States.

Tornadoes; A Story of a Long Inheritance.—By Professor William Morris Davis, of Harvard University.

[Abstract of a lecture before the University Travellers' Club, January 27, 1891.]

After illustrating the effects of a number of tornadoes by lantern slides, the lecturer defined a tornado as a violent whirling storm of small dimensions, rapid progression and brief duration, and then considered the origin of its destructive winds. Following the generally accepted theory that the tornado whirl is developed in a convectional up-draft, it was shown, by analogy with the eddy of water running from a basin by a vent at the bottom, that if tornadoes did not whirl, they would lose most of their violence. But they all whirl, and nearly all in the same direction—from right to left. The general possession of so well-marked a feature implies that it has been inherited from some antecedent condition, and it was therefore asked, where are tornadoes formed? The records of the Signal Service leave no room for doubt on this point; tornadoes are nearly always formed in the southeastern quadrant of the large cyclonic storms or areas of low pressure, so characteristic of our daily weather maps, and to whose passage across the country we owe most of our weather changes. The cyclonic storms are vast whirls, their winds sweeping over great spirals as they gradually approach the center of low pressure, but generally without destructive velocity, at least on land. The spirals of our cyclonic storms universally turn from right to left, and in this motion we undoubtedly have the reason for the general right-to-left whirling of the tornadoes; for when a little whirl springs up in a great whirl, the turning of the two will be in the same direction. This may suffice to show why tornadoes turn; but it may next be asked why cyclonic storms turn. An answer will be found by examining the region of their occurrence; they are developed in the belt of prevailing westerly winds, which, taken as a whole, form a vast whirl from right to left around the North Pole. When the cyclonic disturbance arises in this polar whirl, it must turn in the same direction as the polar whirl turns, that is, again from right to left. Tornadoes may therefore be said to have inherited their habit of turning from their grandparent, the general circulation of the winds of the northern hemisphere around the North Pole.

But why do the winds whirl around in this way? Why not the other way? Why do they whirl at all? The sun warms the air at the equator, while it is cooled at the poles; the expanded equatorial air flows away aloft north and south, and for this reason we should expect to find caps of high pressure around the poles; but it must be remembered that the interchange between equator and poles was established in an atmosphere that was already rotating with the earth on which it lay. It possessed this rotation along with the oceans in the youth of the earth, when all was still glowing and molten with heat; and it was only later on when the earth had cooled somewhat that the sun began to determine our climatic zones, and start an atmospheric circulation; hence, as the equatorial overflow runs poleward, it approaches the axis about which it rotates; in accordance with the principle of the conservation of areas, it must take on a whirl around the pole from west to east, or, as the North Star would say, from right to left; and this whirl is so much faster than the rotation of the earth that the high pressure expected at the poles as a result of low temperature is reversed into low pressure, due to excessive centrifugal force. We thus learn that the prevailing winds whirl around the pole because they had a way of turning with the earth; that the cyclonic storms possess a spiral circulation from right to left because they are formed in a whirling atmosphere; and that the tornadoes whirl because they are generated in whirling cyclones.

But why does the earth rotate? On inspecting the planets of our system, we find that rotation appears to be a common characteristic of all; the sun, the moon, Mars, Jupiter and Saturn all turn one way; these being the only bodies of our system whose direction of rotation has been surely observed. Moreover, they all turn on their axes in the same way as they revolve around the sun in their orbits. Saturn's rings turn in the same direction. Let us imagine what would happen if these rings were clotted somewhat at a certain point; the parts behind the clot would be hurried on, and thus gaining a greater orbital velocity and consequently a greater centrifugal force would tend to pass outside of the clot; the parts ahead of the clot would be retarded, and thus losing some of the centrifugal force that they had before, would be drawn by the planet somewhat inside of the clot; the parts outside of the clot would be drawn inwards, and thus approaching the center of their orbital revolution, they would be accelerated and would tend to run ahead of the clot; while the parts on the inside of the ring would be drawn outwards and would lag behind the clot. All these parts thus conspire to set up a whirling around the clot as a center, still maintaining their orbital motion around Saturn. As a result, when all the matter of the rings is concentrated at the clot, it will form a mass possessed of an axial rotation; and this rotation will be in the same direction as its orbital revolution. It has, therefore, been supposed that the planets once existed as rings around the sun; that the rings were not so evenly balanced as are those of Saturn, which survive as rings even to this day; and that the planetary rings gradually coalesced into rotating balls and thus gained their community of rotation. And yet why should the planetary rings have all rotated the same way? For no reason, unless they inherited their movement from a common ancestor. This ancestor is thought to have been a vast nebula, whose inward spiral falling together gradually produced the rings, all turning one way around the great central mass, which later formed the sun. But why did the nebula turn around? Why did its parts not simply fall together in radial lines? Because the nebula came from chaos, and we must not imagine that chaos possessed so specialized an arrangement as no motion, or as precisely such motions as would neutralize all tendency to rotation while its parts were falling towards their common center of gravity. Anything but this in chaos; there must have been motions of all kinds, and their resultant being unbalanced with respect to their center, they necessarily developed a whirl as they coalesced into the primeval nebula, and this whirl, through rings, planets, winds, cyclones and tornadoes, has never been lost.

It is not simply to the imagination that we must trust for our realization of these past stages of our history. The sun, being vastly larger than the earth, still retains a glowing temperature, such as the earth has long since lost. Saturn's rings, evenly balanced, marvellous examples of retarded development, illustrate a stage long out of date with the unevenly arranged rings of the planets. Most of the nebulae of the distant sky are still in the chaotic stage; but the great nebula of Andromeda, when finely photographed, shows a series of incurving spirals, such as the North Star saw in our nebula so long ago. It is the inheritance of this early habit that makes our tornadoes whirl.

The Physical Geography of Southern New England.—By Professor William Morris Davis.

[Abstract of paper read before the University Scientific Association, January 28, 2891.]

On climbing from the valleys which the railroads follow in southern New England, the student finds himself on a broad upland of moderate inequality; the sky-line is remarkably even; isolated hills occasionally rise above the upland, but its chief variety of form is found in the valleys that are etched beneath the general surface. The upland is, in fact, the remains of a nearly even surface, a peneplain, whose origin and relationships must be examined. It is not a constructional plain, like those even surfaces of the land lately uncovered from the water in which their layers were deposited; for all southern new England is a region of ancient rocks, whose arrangement and texture demonstrate that they have been deeply buried, and whose present surface is therefore not the original surface, but the product of long enduring erosion. In the far West, we find structural plains or plateaus, the even surface of some hard stratum, such as a sheet of lava, from which the once overlying beds have been denuded, but on which the denuding forces progress slowly in their destructive work, and thus produce an area of relatively level country. This explanation cannot, however, be applied to southern New England, for its structure is not of horizontal strata, but of greatly distorted and overturned schists and bedded rocks; its old peneplain surface had no sympathy with such a structure. The only proper analogue with which New England can be compared is a mountainous country, for only in such a region can we find the great distortions that characterize the New England rocks. In their youth, mountains present constructional forms of great irregularity and massive outline, often enclosing basins in which lakes accumulate if the climate be moist enough. In their maturity, their early constructional form is reduced in size but increased in variety of topographical detail, particularly by the development of valleys and ravines on the weaker beds that have been discovered by erosion: thus, in maturity, mountains gain the beauty possessed by all forms that are thoroughly, patiently, elaborately and skilfully worked or carved. But in old age, if the mass stands still long enough, all the massiveness of youth and the variety of maturity are worn out, the mountain is reduced to a surface of small relief—a peneplain—whatever its original form may have been; and this peneplain stands close to the level of the sea. It follows, therefore, if this explanation is to apply to the old mountains of New England, that the peneplain, which we may even now recognize in the Highlands, was once a lowland of denudation; that its present altitude is not to be explained as an incomplete action of erosive forces on the original mass; but that the mountains that once existed here have been practically all rubbed out by the successful work of erosion during a long cycle of destructive action; and that the present altitude of the highlands is the result of subsequent massive elevation, but to a little greater height in the northwest, where the uplands are highest, than in the southeast, where they descend under sea-level.

The peneplain, thus formed and elevated, is easily traceable to other parts of the Atlantic slope, and it constitutes the largest and most important topographic element of this region. Since its elevation, valleys have been worn into it; these are broad where the rocks are soft, as along the Triassic belts, or on the weaker members of the paleozoic series in Pennsylvania; nearly all our better farms are in these lowland valleys; the valleys are narrow where the rocks are hard, as in the crystalline areas of New England, southern New York and northern New Jersey; these areas include our rugged country, the valleys leading the railroads, and the stony highlands between them supporting only an isolated rural population. The valleys are deep where the peneplain was lifted high, as in northwestern Massachusetts, where the Deerfield trenches the mass profoundly, and in the Highlands where the Hudson has cut its magnificent gorge; they are shallow near the sea-coast, as where the Connecticut or the Thames run into Long Island Sound. The hills that rise above the old peneplain surface are remnants of a late Cretaceous topography; Monadnock and Wachusett are conspicuous examples of this class: the valleys that are sunk into the peneplain are all of post-Cretaceous date, whether they are deep like the gorge of the Hudson through the Highlands of New York, or relatively shallow like the gorge of the Connecticut where it approaches the Sound.

The valleys of the post-Cretaceous cycle were for the most part cut out while the land stood somewhat higher than it now does, and the later submergence of a moderate amount produced the fiorded coast, seen in the deep passages of the Hudson and the Connecticut, where tides are felt far up from the river mouth, and again in the deep indentations of the coast, as Narraganset Bay or Boston Harbor, in the rugged outline of Maine, and in the outlying islands at various points, such as Cape Ann. A marked control is exercised by these forms on the maritime development of our people.

Upon a country thus fashioned came the ice invasion from the North. We find its products in irregular morainic accumulations of drift rubbish, in rounded ledges, in scattered boulders, in drumlins, eskers, kames and sandplains, as its various deposits are called; and by the freshness of these products, we infer that the disappearance of the ice-sheet is of recent date. We find also that by the excavating action of the heavy ice-sheet, relatively shallow basins were scraped out; and by the irregular deposition of the drift, many valleys were clogged, and thus our numerous lakes were formed. It is probable that not one existed in New England before the ice came; now they are counted by the hundred, adding greatly to the picturesqueness of the region. Moreover, as the ice melted away, the streams were overloaded with rubbish; they spread out sands and gravels in their valleys, forming broad flood-plains, and the height to which the flood-plains grew was probably increased by a depression of the land at that time, which many think resulted from the weight of the ice on it. But since the ice has disappeared and the land has risen somewhat towards its former level, the streams, no longer embarrassed with more load than they could carry, have set to work to remove the valley fillings, and thus the terraces are formed, so characteristic of our New England waterways. The streams, sinking their channels into the valley fillings, often, however, failed to find again the line on which they previously flowed, and settled instead on a buried spur of rock; down stream from the spur, the loose sands and gravels are easily cleaned away, but all excavation up stream from the spur is retarded by the slow work of the stream in cutting a passage through the solid rock. Thus our waterfalls are produced, and by these many of our manufacturing cities have grown up, with investments of capital amounting to tens of millions of dollars, all determined by the failure of the streams to rediscover their old valleys.

Along the shore, as the land now stands after successive elevations and depressions, the sea frets on the uneven surface of the submerged rocky hills; the present position of the shore-line is evidently but recently acquired, for there has been little rock cutting yet done. The headlands are worn back into low cliffs, and the heads of the intervening bays and coves are often enclosed into marshy ponds by the building of a bar across them midway; the bar consisting of rubbish from the headlands and from the bottom, strung in a smooth curve from side to side; here the waves roll in evenly, breaking in rhythmic accord with the swinging arc of the beach that they have built. At low tide, the waters escape from the marsh or valley behind the bar by an outlet that is often pushed close to one side of the bay, in the direction of the stronger waves and currents. Where the shore is mostly made of loose materials and glacial drift, the waves have worked to better effect; thus, from Plymouth southward, the morainic sandhills are all cut off evenly, and the hollows between them are bridged across by bars, forming together a long sweeping curve of early maturity. The outside of Cape Cod shows a similar rapid development of mature simplicity; the incurved hook, with its dunes at the north end of the cape, where Provincetown lies sheltered from the outer storms, has been built of sands carried there from the outer side, where the cliffs have been evenly cut by the waves rolling in from storms on the Atlantic.

It thus appears possible to make a general classification of the physical features of southern New England in accordance with the structures on which they are formed, with the attitude in which these structures have stood, with the processes that have worked on the structures, and with the degree of advance attained by the working processes. Although the geological history of New England is extremely complicated, and at present but half understood or less, the topographic development of its southern portion is a much simpler problem, and is carried further toward its solution.

The Triassic Sandstone of the Connecticut Valley.

—By Professor William Morris Davis.

Professor Davis lectured before the class in geology on January 28 on the Triassic sandstone of the Connecticut valley, illustrating the stages in the history of this formation by means of a working model. The first stage was that of accumulation; layers of sandstones and shales in great thickness, with sheets of lava, outpoured during the accumulation of the sediments, and at least one great intrusive sheet, amount to perhaps ten thousand feet or more in vertical measure. By opening the model on a vertical section, the conduit up through which the lava sheets rose and the volcanic cones that were presumably formed at the surface when eruptions took place, were shown in their relation to the foundation of crystalline rocks and overlying sediments. The second or post-Triassic stage was that of tilting and faulting, by which the formerly even surface of the finished formation was thrown into the attitude of a faulted monocline; the constructional topography, following from such a dislocation, was exhibited by the working of the model. The third stage, initiated during the second but continued long afterwards, was one of destructive erosion, enduring so long as to carry the elevated mass through the period of topographic maturity and reduce it to old age, that is to a surface of moderate relief at the base level of erosion—to a surface almost plain, a peneplain. This was imitated by removing portions of the model so that its uneven form, produced by tilting and faulting, was bevelled off to an even surface. Good reasons may be presented for regarding this stage as enduring through Jurassic and Cretaceous time. The fourth stage in the history of the valley came somewhere in Tertiary time, when the region was gently uplifted, with a faint tilting to the south or southeast. The streams then set to work again, and cut valleys close down to the new baselevel; where the rocks were soft, the surface has been again denuded to a peneplain, the lowland of the present Connecticut valley; but where the rocks are hard, as in the lava sheets and in the crystalline rocks of the foundation, relatively little erosion has been accomplished on the interstream areas, and a good indication of the ancient uplifted peneplain is still to be seen. The crystalline highlands on either side of the Triassic belt, and the crests of the trap ridges in the sandstone area, still preserve much of the height to which they were raised after the Jurassic-Cretaceous denudation; but the weak sandstones are etched out into lowlands. This was illustrated by a further dissection of the model, whereby an imitation of the present relief of the country, as depending on its structure and its history, was secured. The later glacial stage was not described, being relatively unimportant.

Bishop Hill: A Religious Communistic Society in Henry County, Illinois. By Michael A. Mikkelsen.

[Abstract of a paper read before the University Historical Seminary, January 30, 1891.]

The Bishop Hill Colony is remarkable, firstly, for being an experiment in practical communism; secondly, for having been largely instrumental in building up the early industries of Illinois. It was founded by religious refugees from Sweden, and flourished between the years 1846 and 1862. Its history may be shortly summed up as follows.

About the year 1842, the peasant Eric Janson began to hold religious conventicles in Helsingland, one of the middle provinces of Sweden. His teaching diverged in several important respects from that of the Established Church, and he was ultimately obliged to leave Sweden. In 1846, and subsequently, his adherents to the number of eleven hundred emigrated and settled upon the site of the present town of Bishop Hill, where, under Eric Janson's leadership, they formed a socialistic theocratic community. Bishop Hill immediately assumed the chief place among the neighboring settlements. From 1846 to 1850, the Jansonists put between 10,000 and 15,000 dollars in gold into circulation, which was a matter of no mean economic importance at a time when business was principally conducted by barter and when the only money in use was paper money valued at a few cents on the dollar. In 1850, the population of Bishop Hill was about 1000, while the entire population of the county was only 3,800. The community owned in fee simple, or possessed an equitable interest in, about 1,400 acres of land, which was partly under cultivation and partly set aside for the pasturage. In May, 1850, Eric Janson was assassinated. The leadership devolved upon Jonas Olson. In May, 1854, the community reorganized under a charter from the State Legislature, according to which the management of its temporal and spiritual affairs was entrusted to a board of seven trustees.

The village, when at the height of its prosperity, contained twelve brick, houses, the largest of which was 200 x 45 ft., and four stories in height, besides six substantial frame buildings. It possessed a general store and post-office, a smithy, a wagon shop, a furniture shop, a harness shop, a tailor shop, a shoemaker shop, a brewery, a bakery, a weaving establishment and dye house, a hotel, a printing office, a hospital, bath houses, laundry, and mills and manufactories of various kinds. The wagons placed by the community upon the market were extensively and favorably known for their solidity and durability. Its sale of brooms was considerable. Its linens and matting and woolen goods found a ready market. The community introduced improved breeds of cattle, cultivated small fruits, and gathered medicinal herbs. In short, Bishop Hill was the principal commercial and industrial centre between Peoria and Rock Island. The speculative atmosphere in the general business world during the years immediately preceding 1857, however, had a deleterious effect upon the community. Its trustees launched into speculation. They acquired real estate in Nekoma, Galva, Chicago, and elsewhere; they established a commercial depot in Galva, and dealt in lumber, grain, and pork; they operated a coal mine, engaged in banking, and accepted a five million dollar contract to grade the Western Air Line Railroad across the State of Illinois. The crash came in the commercial crisis of 1857. In addition to the ensuing financial complications, religious dissensions arose, which led to the dissolution of the community in 1862. Its landed estate then amounted to 12,000 acres, and its entire property was valued at nearly one million dollars.

The Linguistic Position of Turkish. By J. Dyneley Prince.

[Abstract of paper read before the University Philological Association, January 16, 1891.]

Osmanli or Turkish κατ'ἐξοχήν is the chief member of the Turkic group, of the agglutinative family of Ural-Altaic or Ugro-Tartaric languages.

The application of the term "Turanian" to this group has been shown by the researches of Sachau and Halévy not to be scientifically justified.[1]

The "Turya" of the Zend-Avesta means simply Syria, coming from an original "Athura" just as "Syria" arose from "Assyria." According to this a Turanian language would be a Semitic one.

It is interesting to notice that the phenomenon of vowel harmony, which in some form or other is present in every member of the Altaic family, is found in the Sumero-Akkadian language, not only in the lexicographical material but also in the grammatical inflection.[2] If there were no other evidence than this for the existence of Sumero-Akkadian, these inflectional phonetic changes would prove that we have here not a cryptography, but a special living idiom. Should Akkadian turn out to be Altaic, it would occupy the same position to this family as Sanskrit does to the Aryan or Assyrian to the Semitic group.

The Osmanli Turkish is essentially a mixed language, having borrowed to an enormous extent from the Arabic and Persian. Influenced by the language of the Koran, it was only natural that the Turks, on accepting Islam, should have taken over bodily a great number of Arabic words and expressions, and their political relations and geographical connection with Persia explains the large stock of Persian idioms.

Persian poetry has been, to a great extent, the former of Turkish verse, and it is chiefly in poetry that the Turks use their Persian expressions. In the higher style of Turkish, the proportion of native to foreign words is about one-third; therefore to know Turkish thoroughly it is necessary to have a fairly good knowledge of both Arabic and Persian.

As an exponent of agglutination and vowel harmony, Turkish is unrivalled, even by Finnish or Hungarian. Its extensively developed, yet simple and regular verbal system, through all the ramifications of which the mind can run with ease, renders it peculiarly adapted to the uses of the student of this branch of philology.

Max Müller is certainly right in saying that "if a college of the most distinguished scholars had met for the purpose of constructing a language, nothing more regular or symmetrical could have come from their hands than we have here in this living tongue."

Notice of Dr. Hench's edition of the Monsee Fragments.

[From *The Nation*, New York, February 26, 1891].

"We note with pleasure the appearance of a new edition of the Old High German 'Monsee Fragments' by an American scholar, Mr. G. A. Hench" (Ph. D., J. H. U., 1889), "the publisher being Karl J. Trübner, of Strassburg. It is, to be sure, a work for the specialist in Germanic philology, but as it is a pioneer venture of American scholarship into a field hitherto left altogether to the Germans, a word or two concerning it may not lack interest for the general reader. The "Monsee Fragments" consist of the mutilated remains of a ninth-century codex which contained Matthew's Gospel, two anonymous homilies, a tractate of St. Isidore, and a sermon of St. Augustine; all in Old High German with the Latin original accompanying. The codex appears to have been written, according to the editor, in the early part of the ninth century at the monastery of Monsee in Austria. In the fifteenth century it was cut up and used for binding other codices. Towards the end of the eighteenth century these codices, together with the rest of the Monsee collection of books, were incorporated with the Imperial Library at Vienna. Here the mutilated MS. remained unnoticed until 1834, when it came under the eye of the librarian, Stephan Endlicher, who at once discerned its importance and communicated his discovery to Hoffmann von Fallersleben. The two then searched for the pieces of the codex, pieced together and deciphered what they found, and published such fragments as, when put together, made a considerable part of a page. A later editor, Massmann, added other fragments, but allowed numerous errors to creep into his work. In 1868 two more fragments were found and published by themselves. Portions of the manuscript were collated for a new edition by the late Professor Scherer, but a new and careful collation of the whole remained a desideratum. Mr. Hench, by using a magnifier and holding the parchment up to the light, has, in spite of time, succeeded in reading the MS. more closely than any of his predecessors, and correcting many errors of omission and of commission. The text is accompanied by a grammatical treatise and a glossary. The whole, it may be added, is preliminary to a new photo-lithographic edition of the Old High German Isidore, which Mr. Hench is preparing in the intervals of professional duty at the University of Michigan. The Isidore has already been announced by Trübner as a forthcoming number of the well-known series, 'Quellen und Forschungen.'"

This monograph was accepted as Dr. Hench's dissertation for the degree of Doctor of Philosophy in the Johns Hopkins University. Copies may be obtained from The Johns Hopkins Press. Price, $1.00.

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[1] "Mélanges Altaïques," par E. de Ujfalvy de Mezö-Kövesd. Paris, 1874.

[2] Fritz Hommel, "die Sumero-Akkadische Sprache." München, 1885.

A Review of Dr. G. H. Williams's "The Greenstone Schist Areas of the Menominee and Marquette Regions of Michigan." By W. S. BAYLEY.[1]

Although completed as long ago as 1887, it is only within two or three weeks that Dr. Williams's study of the greenstone schists of Michigan has been issued from the Government Printing Office. Ordinarily the postponement of a publication for such a length of time detracts greatly from its value. In the present case, however, this is not true, for the rocks discussed in the bulletin are just now the subject of extensive study by the Michigan and the United States geologists. In a few introductory remarks Prof. Irving gives a general account of the geological relations of the rocks studied by Dr. Williams and points out the importance of a satisfactory knowledge of their origin to the question as to the ages of the various rock series in the Marquette and Menominee regions. Brooks and Rominger regarded the schists as metamorphosed sediments, whose schistosity is the result of bedding, and whose age is the same as that of the overlying iron ores and unaltered sediments, supposed to be Huronian. Irving, on the contrary, believed the schists to be much older than the iron-bearing rocks, and thought their structure due to secondary processes.

In order to decide the points at issue the investigation of Dr. Williams was undertaken. The Menominee region was carefully examined in the summer of 1885, and the Marquette area in 1886, when extensive collections of material were made. The petrographical description of this material and the discussion of its bearing upon the subjects in debate make up the major portion of the book. In it the several greenstone schists collected are carefully described, their relations to each other and to the intrusives cutting them are worked out in great detail, and the structures found in them are traced back along the entire course of their development into structures characteristic of eruptive rocks. Consequently, it is concluded that the greenstones are schistose forms of what were once massive acid and basic igneous rocks. From the occurrence with them of fragmental tuffs, etc., it is further concluded that many of these massive rocks were once surface flows, and that the region in which they occur was once a region of intense volcanic activity. The proofs upon which these conclusions are based are similar in many respects to those upon which is based the conclusion that the green schists (gabbro-diorites) near Baltimore were derived from gabbros. In the Michigan areas, the original basic rocks that yielded schistose greenstones were gabbros, granular and glassy diabases, diabase-porphyrites, granular and porphyritic diorites and tuffs, while the acid ones were granite, granite-porphyry and quartz-porphyry. Each of these types has yielded schistose rocks, in which all the evidences of pressure, crushing, etc., are plainly evident.

There can no longer be any doubt that the schistose greenstones of both the Menominee and the Marquette regions were once massive, and that they were subjected to great pressure before the deposition of the overlying fragmentals, and, consequently, that they are much older than these. The work of Dr. Williams settles finally the question as to the origin of the greenstone schists, while this together with the work of Irving decides their age.

In addition to the discussion of the special problem outlined above, there are in the bulletin several chapters of very general interest to geologists. The most instructive of these is the chapter on the present state of knowledge regarding the metamorphism of eruptive rocks, which gives an historical outline of the studies upon the subject. In this chapter the author reviews the literature relating to the formation of schists from massive rocks, and so places before American students the wonderful results of European investigations. He shows indirectly that many of the theories proposed by American geologists to account for the origin of the great masses of schists throughout the world are faulty, and that many of these schists are undoubtedly of eruptive origin. This latter conclusion is one that has but just begun to be accepted on this side of the Atlantic, although on the continent of Europe it has been accepted as a well substantiated fact for some years past. Some German geologists have even gone so far as to assert that all true schists are squeezed eruptives (J. Roth, Allgemeine und Chemische Geologie, Band III, 1891). Be this as it may, Dr. Williams has brought to our notice here in America a field that is bound to yield abundant fruits when carefully exploited; for nowhere, perhaps, is there better opportunity for the study of these difficult but important rocks than in the old regions of our own country. It is absolutely essential for the practical geologist to make himself acquainted with the results of European work, if he would add much of value to the science in which he is interested. In no place can he find a more concise and judicial statement of the recent European work on crystalline schists than in the historical chapter of the volume under review. The abstracts of the articles discussed and the quotations from them are full enough to satisfy the needs of most geologists, and these together with the foot-notes, so copiously scattered through the chapter, will serve specialists in petrography as an excellent guide to the literature of dynamically metamorphosed rocks. Teachers in our colleges can get, in the same length of time, no information more valuable to themselves than may be obtained during the perusal of this chapter, nor can they confer a greater benefit upon geological science than by teaching their students the ideas so clearly brought out in it. The time for designating the schists simply as "metamorphic rocks" has passed. We must now begin to learn the meaning of this term. To many of us it has no meaning, but is used merely as a convenient blanket in which to wrap our ignorance of the nature of the schistose rocks and so to hide it from view. There can be no doubt that many schists are squeezed eruptives, others are probably squeezed fragmentals. That any of them owe their schistosity to bedding lamination, as many instructors now teach, remains yet to be proven.

Space prevents a satisfactory review of that portion of the bulletin relating to the changes which minerals undergo when subjected to pressure, and of that part treating of the formation of new minerals under the same conditions. Much that is new is to be found in the pages devoted to these subjects. They will amply repay reading.

Any notice of the book would be incomplete without a reference to the maps and the colored plates of rock structures that so beautifully illustrate the text. Eighteen chromo-lithographic representations of the microscopic characteristics of the most important of the rocks studied leave nothing further to be desired in this direction. The reader may see for himself the striking features of the various rock types, and may rest assured that what he sees is a correct representation of what the writer of the bulletin saw, for the lithographer followed drawings made by the author himself.

The subjects treated in the brochure are of such widespread interest, and the conclusions drawn from the facts described are of such great importance, that we may prophesy for the volume a large circulation both in this country and abroad, among general geologists and petrographical specialists.

Colby University, April, 1891.

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[1] *The Greenstone Schist Areas of the Menominee and Marquette Regions of Michigan*: a contribution to the subject of dynamic metamorphism in eruptive rocks. By GEORGE HUNTINGTON WILLIAMS, with an Introduction by ROLAND DUER IRVING. (*Bulletin of the U. S. Geological Survey, No.* 62, *Washington*, 1890. 8o, *pp.* 241, 29 *figs. and* 16 *plates.*)

Note on Latitude Observations of the International Geodetic Association.

[From *Science*, N. Y., February 20, 1891.]

"Assistant E. D. PRESTON," (Fellow J. H. U., 1876–8), "of the United States Coast and Geological Survey will soon go to the Hawaiian Islands for the purpose of making a series of latitude observations, to be used in connection with others to be made by several of the countries who are connected with the International Geodetic Association. The question of a change in the position of the earth's axis has led to some special refinements in the method of observing astronomical latitudes. Whatever may be the cause of the supposed motion of the pole, whether it results from the shifting of volumes of the atmosphere or water above the surface, or the movement of liquid or semi-liquid masses within the earth's crust, the quantity to be measured is so small that it is necessary to reduce the uncertainty of the determination to a very few feet. The observations at Honolulu soon to be taken up simultaneously by the United States Coast and Geodetic Survey and the International Geodetic Association of Europe will decide whether the variation is a purely local one or whether there is a real change in the position of the axis of rotation. . . . Mr. Preston will also avail himself of the opportunity to make magnetic and gravity observations at a number of points on the islands, including one station on the summit of Mauna Kea at an elevation of 14,000 feet. Some meteorological observations will probably be made as well. . . ."

PERCY TURNBULL MEMORIAL LECTURES ON POETRY.

The members of this University are well aware that in 1889, a lectureship of Poetry was instituted by Mr. and Mrs. Lawrence Turnbull, of Baltimore, as a memorial of their son, the late Percy Graeme Turnbull.

The first course of lectures upon this foundation was given in the month of March, 1891, by Mr. Edmund Clarence Stedman, of New York, upon "The Nature and Elements of Poetry." The second course upon this foundation will be delivered in the Spring of 1892, by Professor Jebb, of Cambridge, England.

Mr. Stedman's lectures were given in Levering Hall, which was filled to the utmost. The members of the University, including many of the Faculty and over two hundred students, occupied the body of the house. The rest of the hall was open to the public.

The first of Mr. Stedman's lectures was given on March 4.

In introducing Mr. Stedman, President Gilman said:

Those who are familiar with this hall have often paused and read the inscription upon a tablet near the door. It bears the name of a bright boy, Percy Graeme Turnbull, who was taken away from earth before he was nine years old. This youth of uncommon promise was endeared to those who knew him not only by the sweetness of his disposition, but by a fine susceptibility to all that is ennobling. When his voice became silent, his parents determined to do what they could to perpetuate his memory by endowing a lectureship which should bear his name and should exert upon successive generations of students the inspiring influence which they had hoped would proceed from the developed powers of their beloved son.

It is fortunate that the first words to be uttered from this memorial chair will be those of a scholar who, from his boyhood onward, has been devoted to letters. A poem on Westminster Abbey, which was written in the earliest days of his college life, is an indication of the talent with which he was gifted. Amid the distractions of business and in the bondage of incessant cares, he has always turned, in hours of freedom and repose, to his books and his pen, so that now we welcome him as one who has won distinction as a poet, as a critic, and as a historian of literature. During all his career, his influence has been inspiring and not repressive. Familiar in his youth with the works of Greek literature, familiar in his manhood with the wide range of European literature, he has held up to his countrymen just standards of criticism,—lofty ideals of excellence.

I have the honor of introducing Mr. Edmund Clarence Stedman, of New York.

SYLLABUS OF MR. STEDMAN'S LECTURES ON THE NATURE AND ELEMENTS OF POETRY.

Lecture I.—(March 4.)

Oracles, Old and New.

Tribute to the founders of the Lectureship.

The foundation itself an outcome of the poetic impulse, proving that poetry is still a "force."

Need of ideality in academic research.

Poetry not a science, but we seek for a scientific statement of its nature and elements.

Cannot make poets, of course, by *á priori* rules.

Reasons why definition of poetry is evaded or befogged.

Brief review of partial definitions and opinions concerning poetry, from Plato and Aristotle to Bacon and Sidney and Dryden, and down to our own day. Views of Goethe, of the Romantic School, the Art School, the Lake Poets, the Transcendentalists, of Arnold, Emerson, Poe, etc.

Next, concerning the relations of Science and Poetry, and of what is meant by the statement that Science and Poetry are antithetical.

Illustrations of the distinction between the scientific and the phenomenal way of looking at things.

In following new trails the Scientist must have the poetic intuition.

Lecture II.—(March 5.)

What is Poetry?

Its essential spirit cannot be defined, because it is primal and absolute. It is *perceived.*

We here have to do with uttered poetry—poetry in the concrete. This I take to be *Rhythmical, imaginative language, expressing the invention, taste, thought, passion, and insight of the human soul.*

As an art of Imagination and Expression, it is creative.

As an inspiration, it reveals what is known by Insight. The gift of the latter is allied with Genius.

The poet's perception of beauty results in the faculty of taste, which has an insight of its own.

Thought works out intellectually the poet's conceptions. Union of philosopher and poet. Dangers of didacticism.

Emotion, passion, the excitant of all true poetry.

All the foregoing factors apply to *art in general.* What distinguishes the poet is expression through language. Poetry an art of words.

The poet's language must have wings and be rhythmical. This is his natural and spontaneous form of expression. If not born with it he is not a born poet. *Theory of Vibrations.* Rhythm distinguishes poetry from imaginative prose, fiction, eloquence; distinguishes Shakespeare from Bocaccio. Poetical prose is not good prose—not the prose of a poet.

Poets must be articulate. We are not considering "poets who ne'er have penned their inspiration."

Respective eminence and provinces of poetry and the sister arts of expression:

Limitations and powers of Sculpture,

Limitations and powers of Painting,

Limitations and powers of Music,

Limitations and powers of Poetry.—Its great superiority lies in combination of movement and intellectual language. It can suggest, also, in its own way, the effects of the other arts.

Lecture III.—(March 6).

Creative Poetry; and the Poetry of Self-Expression.

The difficulty that confronts one who enters upon a general discussion of poetry is its universal range. But looking at the vast field it covers, we see that there are, at all events, two streams into which its galaxy is divided. These do not relate to the technical classification of poetry, to its partition by the ancients into the epic, dramatic, lyric and the idyllic, but have regard to the more essential divisions of expression. Types of poetry are defined by the amount of personality which they respectively hold in solution; in other words, poetry is differentiated by the poet's self-consciousness into that which is creative, objective, free as to invention and vision, and that which is subjective and self-expressive.

The objective masterpieces. Primitive ballads, epics, &c. Direct and creative works. Oriental poetry. Poetry of the Bible; the Psalms, the Prophets, Job.

The Greek poets. The tinge of subjectivity in Greek lyric verse. Sappho. The Anthology. The Syracusan Idyls.

The Attic Drama. Aeschylus, Sophocles, Euripides, Aristophanes.

Latin Poetry. Lucretius, Virgil, Horace, Catullus.

Return to the purely creative masters. Homer. Absurdity of modern theories concerning the philosophic purpose of the Homeric epos.

The Grand Drama. It does not attempt to set things right. Its strength proportioned to its impersonality.

The drama as the highest, because the most inclusive, form of poetry. Shakespeare. Analysis of *The Tempest.*

Browning, and the subjective modern drama.

Lecture IV.—(March 11.)

Melancholia: The Poetry of Self-Expression.

The change from the antique temper to the modern. Dante and his time. "The Divine Comedy."

The personal quality in Milton's work. His early poems. "Samson Agonistes," "Paradise Lost."

The Nineteenth Century, with its interfusion of peoples and literatures, has developed the typical poetry of self-expression, and a new interpretation of life and nature. This began with the Romantic movement.

The Romantic Schools of Germany, England, France.

Goethe, Hugo, etc. Byron, our main example of voice and vision conditioned by the temperament. The Byronic ferment. Keats's preface to "Endymion." Shelley and Byron contrasted. Heinrich Heine.

The impersonal element in art may be termed masculine. The feminine impulse is to lay bare one's own heart and experience. Mrs. Browning.

The self-consciousness of the modern art school. Tennyson, Rossetti, Morris, Sully-Prudhomme, Swinburne, etc.

Matthew Arnold's introspective nature overcoming his critical theory of art.

American poets.

Prose fiction in this era has supplied the craving for impersonal and dramatic literature. Novels, objective and subjective.

Loss of the Pagan tranquillity and creative vision. Our compensation in the greater sympathy and human feeling of the art of Christendom. Morbid processes of the latter. Its highest and characteristic motive typified in Dürer's "Melancholia."

Style allied with self-expression. The final test of poetry is not by its degree of impersonality, but by the measure of a poet's genius, and the beauty and force of its expression. The method which he follows, whether realistic or romantic, objective or self-intrusive, is inessential.

Lecture V.—(March 12.)

Beauty.

Poetry is no exception, but rather the chief illustration, when it is declared that an indispensable function of the arts is the expression of the beautiful.

Discussion of the artists and critics who abjure this declaration. They are simply rebelling against hackneyed standards—are seeking beauty in a new guise. The impressionists.

Question as to the existence of beauty, whether or no it is a mere personal sensation. Modern æsthetics. Its foundation in science.

The poet a phenomenalist. He intuitively acts on the assumption that beauty exists. Academic standards. Revival of old styles from time to time. Contrast between European and Asiatic forms of beauty.

Durability of poems that are beautiful. Beauty the surest preservative of art or poetry.

Poetic beauty as addressed to the eye, to the ear, to the intellect. Beauty of construction, of suggestion, of simplicity, of detail. The idyls of "Ruth" and "Esther" contrasted with "Anna Karénina." Beauty of Emotion. The vox humana.

Lyrical beauty. Its dependence upon inexpressible quality and charm. Evanescence is a feeling which suggests almost the highest charm in nature, art, and poetry. Illustrations of this in English song.

Lecture VI.—(March 13.)

Truth.

Keats's statement that truth and beauty are one. Half-truths are odious, and their expression is what we detest in "didacticism."

Poets of the highest imagination are the most truthful to nature and to nature's possibilities; more so than the so-called "descriptive poets." Illustrations from the antique and the modern.

Truth broadly exhibited. Truth analytic and detailed. Homer, Shakspeare, Browning, Tennyson, the balladists.

Truth to nature. Broad treatment of Wordsworth and Bryant. Great fidelity of American poets, Whittier, Emerson, Lowell, Taylor, etc. Whitman and Lanier.

Want of poetic truth in realism of the photographic kind. Insincerity, also, of many pseudo-classical and pseudo-mediæval poems. This does not invalidate the universal freedom of the poet's range, both as to topic and style.

Byron's and Wordsworth's treatments of nature and life compared.

The pathetic fallacy. This modern sentiment illustrated by the famous "sea-shell" passages in Landor, Wordsworth, Byron, and exquisitely dispelled by Lee-Hamilton. Recognized by the latest *Atlantic Monthly* novelist.

The sane and truthful didacticism of the grand moralists, Ecclesiastes, Lucretius, Omar, Tennyson, Browning, Emerson, Pope.

Poetic truth always ethical *per se*, and without an obtrusive moral. False criticism upon Shelley.

The revolt of Bohemia and Arcadia against Philistia founded in an instinctive sense of the ethics of beauty and the essential truth of art. The wit, and mirth, and humor of their art have their sources in the Divinity above us all.

Lecture VII.—(March 18.)

Imagination.

"Of late," said Mr. Stedman, among other things, "our cleverest artists in verse—for such they are—seem, with a few exceptions, indifferent to thought and feeling, and avoid taking their office seriously. A vogue of light and troubadour verse-making has come, and now is going as it came. Every possible mode of artisanship has been tried in turn. The like conditions prevail upon the Continent, at least as far as France is concerned; in fact, the caprices of our latest minor minstrelsy are largely the outcome of a new literary Gallomania." Believing that Poetry is not very great, very forceful, unless it is either imaginative or impassioned, or both, Mr. Stedman observed that the younger lyrists and idyllists, when finding little to evoke these qualities, have done their best without them. But the note of spontaneity is lost. Moreover, extreme finish, adroitness, graces, do not inevitably betoken the glow of imaginative conception, the ecstasy of high resolve.

The lecturer devoted some brilliant passages to the work of poets, true and otherwise; to those who mistake the wish to create for the creative power, those who write with ease and magnify their office; to those who, equipped with taste and judgment, but lacking imagination, proffer as a substitute beautiful and recondite materials here and there; and to those whose seeming depth is often mere turbidness.

Not the least interesting and valuable portion of the lecture was that dealing with the true poet's instinct for words—those keys which all may clatter and which yield their music to so few. This preceded his consideration of the elemental and cosmic quality of true poets and true poetry —a part of his lecture in which he rose to an eloquence that strongly moved his auditors.

Lecture VIII.—(March 19.)

The Faculty Divine: Passion, Insight, Genius, Faith.

Poetry which lacks passion is seldom imaginative. It may tranquillize, but not exalt and thrill.

What is passion in literature. The Miltonic canon.

Passion cannot be stimulated by the mere artisan in verse.

Not confined to the erotic. Poetry is uttered emotion. Feeling. Self-consciousness of modern verse.

Byron. Shelley. Mrs. Browning. Emma Lazarus. Poe. Emerson's "Threnody." Browning. The Rossettis.

Whittier the most impassioned of the American elder poets.

Human action and passion the theme of poets of the first order.

All human passions good *per se*. Why tragedies appeal to us. The soul's delight is in all forms of experience.

Force of suggested passion. Shakespeare and the modern stage.

Genius. Its verity, nature, and origin. Distinction between creative genius and assimilative taste. Insight. The mystic and seer. Discontent of noble workmen.

Inspiration and prophesy.

Faith. The present transitional and unsettled condition. Need of seriousness. The past triumphs of inherited faith. The new faith through knowledge.

The Church Liturgy considered as a symphonic masterpiece.

Poets of the transition. Arnold and Clough.

Superiority of poetry and other works of art to the criticism upon them. Students must go to the poets themselves.

PROCEEDINGS OF SOCIETIES.

Scientific Association.

February 18.—Ninety-eighth regular meeting. Professor Brooks in the chair. Seventy-five members present.

Papers read:
Recent Work in Spectrum Analysis, by H. A. Rowland.
The Report of the Challenger Expedition, by T. H. Morgan.

March 25.—Ninety-ninth regular meeting. Professor Brooks in the chair. Sixty-two members present.

Papers read:
On the Structure and some Physical Properties of Soils, by Milton Whitney.
On the Scientific Work of Clerk Maxwell, by A. L. Kimball.

Philological Association.

February 20.—One hundred and eighth regular meeting. Professor Gildersleeve in the chair. Thirty-six members present.

Papers read:
The Book of Ecclesiastes in the Septuagint Version, by I. M. Casanowicz.
A Classical Reminiscence in Shakespeare, by A. Gudeman.

March 20.—One hundred and ninth regular meeting. Professor Gildersleeve in the chair. Thirty-eight members present.

Papers read:
On the Origins of the Romances of Chivalry, by F. M. Warren.
The Marriage of Saraṇyū, by M. Bloomfield.

Historical and Political Science Association.

January 30.—Dr. R. T. Ely in the chair.

The Bishop Hill Settlement, Illinois, by M. A. Mikkelsen. (See page 80.)
The Newspaper as a Source of History, Conference.

February 6.—Dr. H. B. Adams in the chair.

Religion in the Province of North Carolina, by S. B. Weeks.

February 13.—Dr. H. B. Adams in the chair.

Brown University under the Administration of President Andrews, by W. H. Tolman.
Facts for Henry George, by A. B. Woodford.
The Bright Side of the Industrial Situation, Conference.

February 20.—*Joint Session of English and Historical Seminaries.*

Development of Magazine Literature in Philadelphia, by A. H. Smyth.

February 27.—Dr. H. B. Adams in the chair.

A Literary Politician (Walter Bagehot), by Woodrow Wilson.

March 6.—Dr. H. B. Adams in the chair.

Local Government in Switzerland, by J. M. Vincent.

March 20.—Dr. H. B. Adams in the chair.

Arnold Toynbee and Work among the Poor of East London, by D. C. Branson.
University Extension in England, by H. B. Adams.

Mathematical Society.

February 12.

Paper read:
Mean Centres of Position, by W. C. L. Gorton.

March 12.

Papers read:
On the Geometry of the Circle, by John F. Springer.
Note on the Curvature of Surfaces, by F. Franklin.

Naturalists' Field Club.

January 21.

Reports were made and papers presented
On the Colors of Animals, by T. H. Morgan.
On a Collection of Grasses, by B. Sollers.
On Aberrant Forms of common Bladdernut, by W. Brommell.
On the Life History of a Fungus Growth on a Wasp from Jamaica, by B. W. Barton.

February 11.

Reports were made and papers presented:
On the Habits of Crossbills, by G. W. Field.
W. Brommell exhibited a number of Maryland Grasses.
B. W. Barton spoke of a Hybrid from Dog and Fox; and on a species of Chestnut.

March 11.

G. L. Smith exhibited a collection of Goldenrod.
W. Brommell spoke on Rare Plants in the Field Club Area.
B. W. Barton reported on some experiments with the burrowing seed of certain plants, and spoke of the probable function of "Rattle Pods."

Young Men's Christian Association.

December 11.—After a report of the committee on missions and charities the meeting was addressed on Sunday school work by Rev. E. A. Lawrence, and on Charity Organization by Mr. John Glenn. President Gilman also made a few remarks.

January 15.—Annual business meeting. There are 183 active, 30 associate, and 13 sustaining members. The committee on Library reported 868 volumes on the shelves and 66 periodicals received. Notice was given that the committee on missions and charities would act as a bureau of exchange for missions and students desiring Christian work. Three lectures in the course on the Bible were announced to be delivered by Professor Griffin, Dr. W. R. Harper, of Yale, and Joseph Packard, Esq.

Officers were elected for the ensuing year: *President*, Dr. M. D. Learned; *Vice-President*, Mr. H. G. Hoadley; *Corresponding Secretary*, Mr. E. W. Bowen; *Recording Secretary*, Mr. C. G. Baldwin; *Treasurer*, Mr. G. L. Stewart; *Executive Council*, Professor G. H. Emmott, Mr. E. F. Randolph, Mr. P. M. Maonusson, Mr. W. C. Chesnut.

The following lectures have been delivered in Levering Hall.—December 14, Dr. W. U. Murkland, on the Passion Play of Oberammergau.—December 21, Professor Bertrand, on the Successors of the Huguenots in France.—February 1, Chaplain Clark, of U. S. Naval Academy, on the Bible; as an introduction to a series of lectures on the Scriptures.—February 15, Professor Griffin, on the Ethics of the Bible.

RECENT APPOINTMENTS.

Joseph A. Fontaine (Ph. D., 1886)—Associate Professor of the Romance Languages, Bryn Mawr College.

Clarence C. Freeman (Graduate Student, 1888–90)—Professor of English, Southwestern Baptist University, Tenn.

Benjamin Ives Gilman (Fellow, 1881–82)—Lecturer (for 1891) in Harvard University and Columbia College.

Stephen S. Maxwell (Graduate Student, 1889–90)—Professor of Natural Science, Monmouth College, Ill.

William M. Milroy (Graduate Student, 1885–88)—Professor of Latin, Geneva College, Pa.

Augustus T. Murray (Ph. D., 1890)—Professor of Greek, Colorado College.

Walter H. Page (Fellow, 1876–7) has become the editor of the *Forum*, New York.

Frederick M. Warren, (Ph. D., 1887, and now Associate in Romance Languages)—Professor of Romance Languages, Adelbert College.

William B. Shaw (Graduate Student, 1889–90) has been appointed Sub-Librarian (Legislation) in the New York State Library. This library is one of the best in the country for students of comparative jurisprudence and American history. Mr. Shaw has recently published an Index of State Legislation in 1890.

William K. Williams, (Ph. D., 1889) has been made Superintendent of the Classification and Reference Department in the Newberry Library at Chicago. His doctor's thesis on the "Communes of Lombardy from the VI to the X Century," is now ready in the Studies in History and Politics.

Albert Shaw (Ph. D., 1884) has been appointed the American editor of the *Review of Reviews*, with his editorial office at New York City, and Mr. R. J. Finley (Graduate Student, 1888–89) has been appointed assistant editor of the same Review.

Richard Harding Davis (Special Student in History, 1885–86) has been appointed Assistant Editor of *Harper's Weekly*.

THE JOHN MARSHALL PRIZE.

At a meeting of the Trustees of the University, held April 6, 1891, the President of the University stated that a lady in New England had authorized him to offer the University the sum of $500, to be bestowed in annual prizes during the next ten years, under the following conditions:

The prize shall be awarded for the best essay written by a graduate student upon some subject in historical or political science, ancient or modern, and submitted by him or for him to the Academic Council. The prize shall consist of a bronze replica of a likeness of Chief Justice Marshall, together with printed copies of his decisions (if they can be obtained). The prize shall be known as The John Marshall Prize of the Johns Hopkins University.

To indicate the character of the work which the donor desires to encourage, she requests that three copies of the likeness be given as prizes for three essays to be selected by competent judges from the essays already published by recent members of the University. She desires that the further regulations for the bestowal of the prize shall be made by the President of the University, with the concurrence of the Academic Council.

If, at the end of ten years, any balance shall remain unexpended, it shall be devoted by the Trustees to the continuation of the prize, or to any other object that they may select.

If it is agreeable to the Board to accept this gift, a check for the amount will be handed to the Treasurer.

Whereupon the following resolution was adopted:

Resolved, That the President of this University be requested to communicate to the lady from New England who has placed $500 at its disposal, to be bestowed in annual prizes during the next ten years, upon the conditions which she has expressed, the thanks of this Board for the offer thus made, and its cordial acceptance of the gift upon the conditions set forth by her.

Professor C. O. Whitman, of Clark University, has been chosen as the non-resident elector for the Adam T. Bruce Fellowship for the current year.

OBITUARY.

Dr. Thomas McCabe, Associate Professor of Romance Languages at Bryn Mawr College, died suddenly on February 22. Dr. McCabe was an Englishman by birth and received his early training in London; thence he went to the Continent, where he spent several years attending lectures at the Collège de France and the Universities of Rome and Berlin. On coming to America in 1884, he entered the department of Romance Languages at the Johns Hopkins University, where he was a Fellow in 1887–8 and where he received the Doctor's degree in 1888. He was immediately called to the University of Michigan as an Instructor in French, and a year later passed to the State University of Indiana as Professor of Modern Literatures and Director of the German Department. At the end of the last academic year he received a call to Bryn Mawr College, where his ability in reorganizing the department of Romance Languages won for him the high esteem of those with whom he had been associated for so short a time.

Besides being zealous and enthusiastic in his duties, genial and affable in disposition, Dr. McCabe possessed in an eminent degree those qualities which make the successful teacher, and wherever he went, he had the confidence of his pupils, who never failed to become imbued with the earnest spirit of their leader. In his work he showed a particularly keen æsthetic sense for literature and gave promise of occupying an enviable position among scholars in the field to which the best energies of his life had been devoted with great singleness of purpose. In addition to his Doctor's thesis on "The Morphology in Francesco Petrarca's Canzoniere," Dr. McCabe had written an article on "The Geste of Auberi le Bourgoing," printed in vol. IV of the Publications of the Modern Language Association, and he was also a frequent contributor to the Modern Language Notes. Not only have his friends sustained a great personal loss, but the cause of international culture in America has been deprived of an advocate, whose devotion to high ideals was an inspiration to those who came under his influence.—A. M. E.

Mr. George Frederick Gephart, aged 32 years, a well-known lawyer of Baltimore, died suddenly, March 1, at Aiken, S. C. Mr. Gephart's early training was received in the public schools of Baltimore and in the City College, and he pursued studies for three years in this University. Later he went to Dresden and took a special course of law studies. He graduated from the University of Maryland School of Law in 1882. Mr. Gephart was prominently identified with various political and legal movements in the city of Baltimore.

Mr. Harvey B. Edmiston died at San Antonio, Texas, February 27. He was born in Morey County, Tenn. He completed a course in Jackson College, Tenn., and then attended the University of Virginia. He spent the winter of 1885–6 in Baltimore, taking a special course in modern languages, and has since been engaged in teaching.

George H. Francis, graduate student in German and the Romance Languages in this University, died in Baltimore March 26.

Mr. Francis was born in Burlington, Vt., in 1862. His higher academic training, begun at the University of Vermont, was continued at McGill College, Montreal. In 1886 he proceeded to the University of Paris, and was in residence at that institution and at the University of Bonn during the next three years. In 1889 he entered the Johns Hopkins University. In the autumn of 1890 his mother came to reside with him in Baltimore, so that in his long illness he had the comforts of home.

His work in the German Seminary in this institution was largely on the relations of German and French Epic Style, and his thesis was to have been a comparative study, from this point of view, of Hartmann von Aue's Iwein, and of Chrestien's Chevalier au lyon.—H. W.

At a meeting of the German and Romance Seminaries, held April 3, the following Minute was presented and unanimously adopted: —

"The fellow students and teachers of Mr. George H. Francis, graduate student in German and the Romance Languages in the Johns Hopkins University, desire to record their sorrow at his death.

"He won and retained the cordial respect of his associates by his abilities as a student, by his high standard of attainment, his modesty and unfailing courtesy.

"The few who knew him more intimately had frequent occasion to observe in him unusual devotion to a scholar's life, under circumstances of ill health which would have deterred any but a brave nature from engaging in serious and protracted studies."

CURRENT INFORMATION.

The series of Pedagogical Conferences begun in January has been continued. (See *Circulars* 86, page 71).

March 14, Professor H. N. Martin spoke on Methods of Teaching in Science.

March 21, Professor H. B. Adams spoke on Public Speaking.

April 4, Professor D. C. Bell (formerly of Dublin), spoke on the Art of Vocal Expression.

On the evening previous Professor Bell gave a condensation of Shakespeare's Tragedy of Macbeth, and read a selection from Dickens.

President D. C. Gilman delivered an address, March 11, before the Men's Association of the First Presbyterian Church of Baltimore on the Problems of Ignorance and Misery in a Large Town. The address has since been published in pamphlet form by the Association. The address was repeated before St. Paul's Guild.

Professor George H. Williams gave addresses on Geology and Farming in Maryland, and on Geology for the Young before the Teachers' Institute of Carroll County, at Westminster, February 6 and 7.

Dr. W. B. Clark spoke, February 1, before the Convention of Leaf Tobacco Growers of Maryland, upon the Relation of Geology to Agriculture.

Dr. Henry Wood gave a lecture on "Deutsche in England im 17ten Jahrhundert" before the German Branch of the Young Men's Christian Association, February 13. The lecture was printed in full in the *Deutscher Correspondent*, Baltimore, March 6 to 11.

Mr. Edward A. Ross lectured on March 11 before the Old Town Merchants' and Manufacturers' Association, on Bimetallism.

Mr. Robert W. Rogers (A. B., J. H. U., 1887) gave two lectures on Syrian Archæology at the Woman's College, Baltimore, March 22–23.

Dr. Fabian Franklin spoke on March 11 before the Tariff Reform Club of Baltimore, on the Duties on Raw Material.

The Baltimore Society of the Archæological Institute of America held a regular meeting in the Physical Laboratory of the University on March 20. The annual address was delivered by the President of the Society, President D. C. Gilman, upon the Revelations of the Spade in the Nineteenth Century. Professor Gildersleeve gave a brief account of the newly discovered Fragments of Aristotle, recently published by the British Museum. Mr. Edmund C. Stedman was present, and read by request his poem, "News from Olympia."

D. C. Heath & Co. announce that they will soon publish Victor Hugo's Hernani, edited by Professor John E. Matzke (Ph. D., 1888); also an Introduction to Modern French Lyrics, by Professor B. L. Bowen (Ph. D., 1888).

The "Hopkins House of Commons," founded in 1884 under the impulse given by Professor Woodrow Wilson, and for some years a very popular organization, has been revived. A preliminary gathering was recently held and it was determined to continue the Society by obtaining as many new members as possible and resuming regular sessions. Four meetings have now been held with an average attendance of about twenty-five, and it is hoped that the success of the organization is assured. Both graduates and undergraduates are eligible to membership, and the meetings are open to visitors. They are held in College Hall at 8 o'clock every Monday evening.

An Expedition into Southern and Eastern Maryland has been organized, through the co-operation of the Johns Hopkins University, the United States Geological Survey, and the Maryland Agricultural College. The project has been approved by the Governor and Board of Public Works of the State, and one or more steamers of the Maryland Oyster Navy will be detailed for the accommodation of the members of the expedition. The object of the expedition is to study the natural resources of the Southern and Eastern portions of the State. The heads of the Johns Hopkins University, the United States Geological Survey, and the State Agricultural College have designated the following persons as a "Board of Control":

Professor W. B. Clark, of the Johns Hopkins University, Chairman; Professor Milton Whitney, of the State Agricultural College, Secretary and Treasurer; Mr. W. J. McGee, of the United States Geological Survey.

The expedition will leave Baltimore April 23.

The Easter Recess began on March 25, and closed on April 2.

THE JOHNS HOPKINS PRESS.

THE OYSTER.

A POPULAR SUMMARY OF A SCIENTIFIC STUDY.

By WILLIAM K. BROOKS.

250 pp., 12o., 14 plates. Cloth. Price, $1.00.

Professor Brooks has been urged to prepare a new work on this subject, as his reports on the "Embryology of the Oyster" and on "The Oyster Industry of Maryland," which were published by the Johns Hopkins University in 1879 and 1884, are now out of print.

In accordance with these requests, a complete revision of his former volumes with the addition of new matter will soon be published.

Dr. Brooks served as one of the Oyster Commission of the State of Maryland in the years 1883–84, and has received from the Société d' Acclimatation, of Paris, in 1880, its medal for his researches on the development of the oyster.

Especial consideration is given to American Oyster Culture with particular reference to the oyster interest of Maryland.

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By JOHN MARTIN VINCENT.

In press. About 225 pp., 8vo. Cloth. Price, $1.50.

This is the result of a long series of investigations in the history and institutions of Switzerland. In view of the fact that the six-hundredth anniversary of the foundation of Federal Government in that country is celebrated in 1891, this may be considered a timely book. A list of the contents is appended.

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" IV.—The Law and the People.
" V.—The Federal Executive (Bundesrath).
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" VIII.—International Relations.
" IX.—Federal Finance.
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PART II.—STATE GOVERNMENT.

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By INAZO (OTA) NITOBE.

198 pp., 8vo. Cloth. Price, $1.25.

Out of the mass of materials, are selected the most interesting features in the intercourse between the United States and Japan. A few of the points dwelt upon are the reasons why Japan closed her ports for two centuries and a half; the means by which Perry opened the country to foreign commerce; and the subsequent manner in which the United States dealt with the Island Empire.

The book is valuable, not only because of the events it narrates and the statistics it contains, but also because of the justice done the actors in our international history; while to those who are interested in the educational and religious phases of our foreign relations, there is an impartial and clear statement of facts.

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